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(12) **United States Patent**
Segall

(10) **Patent No.: US 9,157,249 B2**
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(54) **RELOCATABLE HABITAT UNIT**

(71) Applicant: **Stuart Charles Segall**, San Diego, CA (US)

(72) Inventor: **Stuart Charles Segall**, San Diego, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**

E04B 1/343	(2006.01)
E04B 1/00	(2006.01)
E04H 1/12	(2006.01)

(52) **U.S. Cl.**

CPC ***E04H 1/1205*** (2013.01); ***E04B 1/343*** (2013.01); *E04B 1/34321* (2013.01); *E04B 2001/34389* (2013.01)

(58) **Field of Classification Search**

CPC E04B 1/00; E04B 1/343; E04B 1/34321; E04B 1/34326; E04B 1/34384; E04B 2001/34389

USPC 52/143, 79.2, 79.1, 79.5, 79.9, 79.12

See application file for complete search history.

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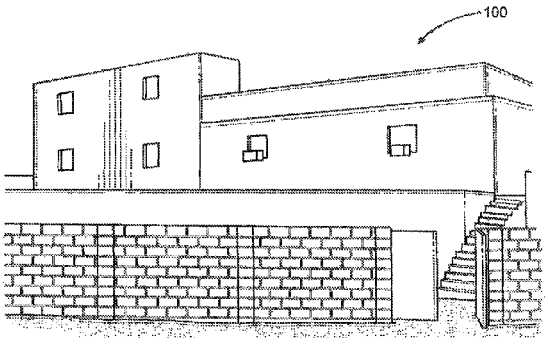
Primary Examiner — Phi A

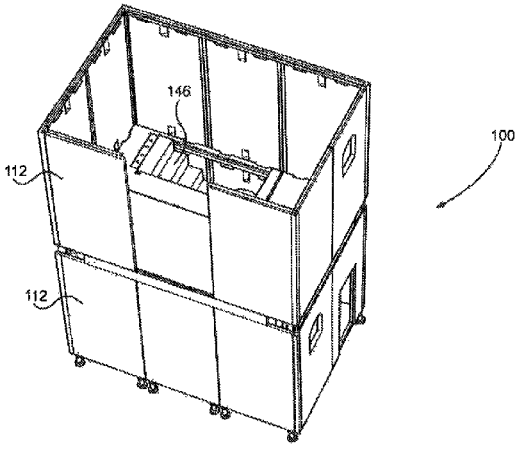
(74) *Attorney, Agent, or Firm* — Gary L. Eastman, Esq.

(57) **ABSTRACT**

A field-deployable construction set for the assembly of a Relocatable Habitat Unit (RHU), used for simulating real world environments without costly construction expenses. The various panels, supports, and accessories used to construct an RHU provide the user with innumerable options for floor plans and building design, further providing significant options for reconfiguration of floor, ceiling, and wall panels without having to disassemble the structure. The exterior composition of the expanded polymer foam is customizable to provide a realistic environment for high quality training in a versatile system that is deployable by truck or aircraft and can be assembled with only a single tool.

11 Claims, 13 Drawing Sheets





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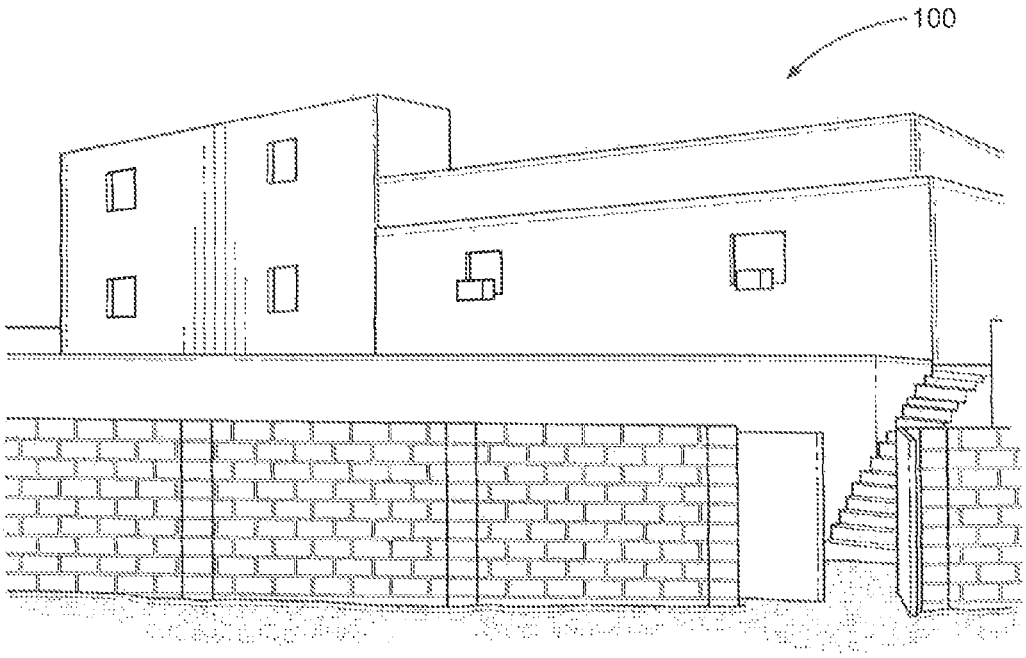


FIG. 1

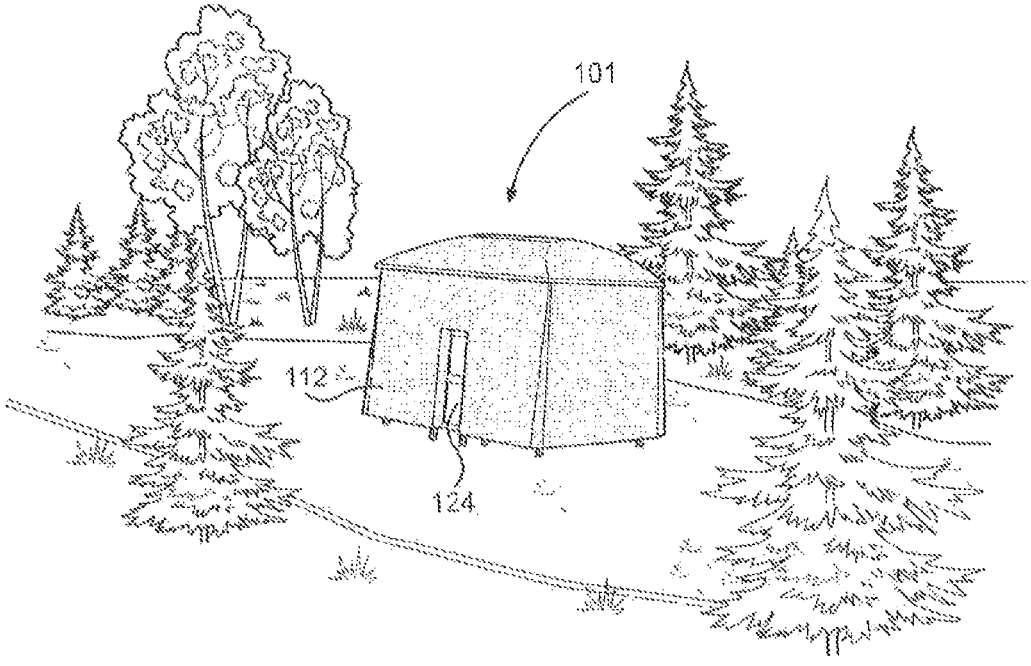
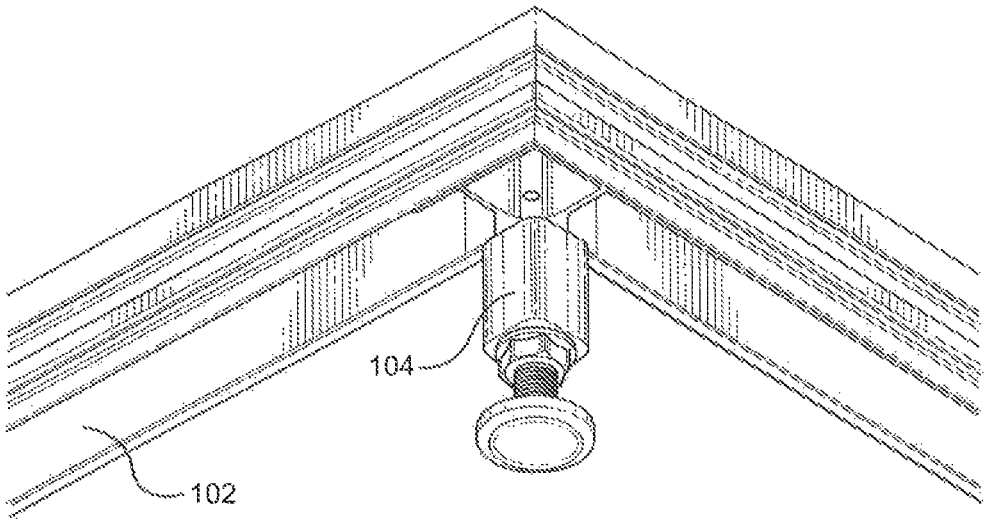


FIG. 2



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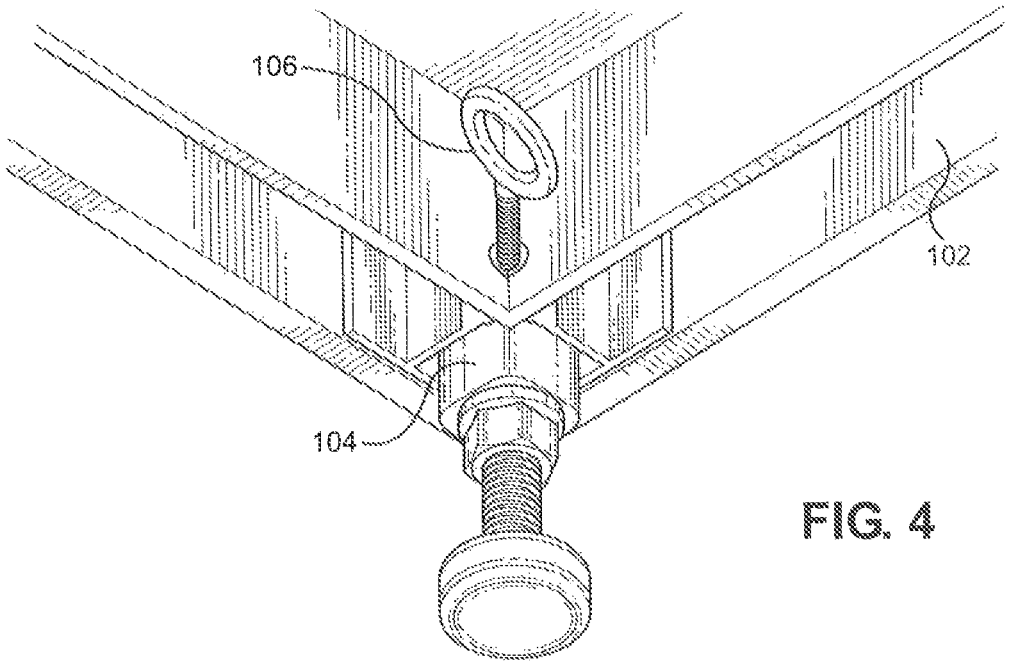

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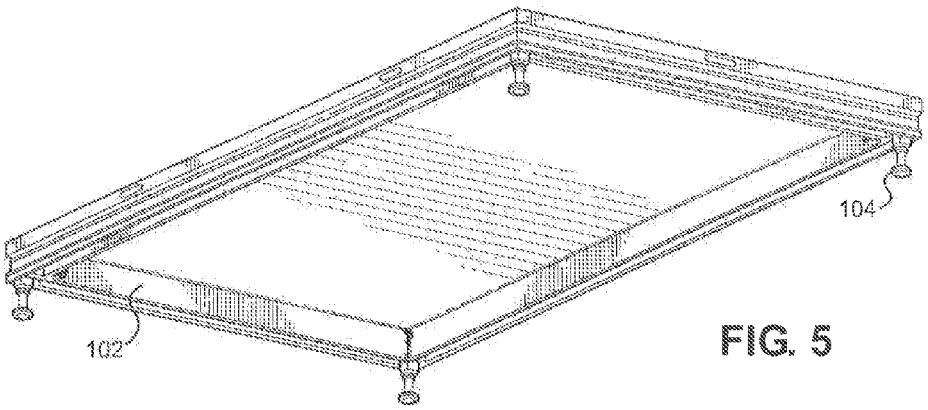

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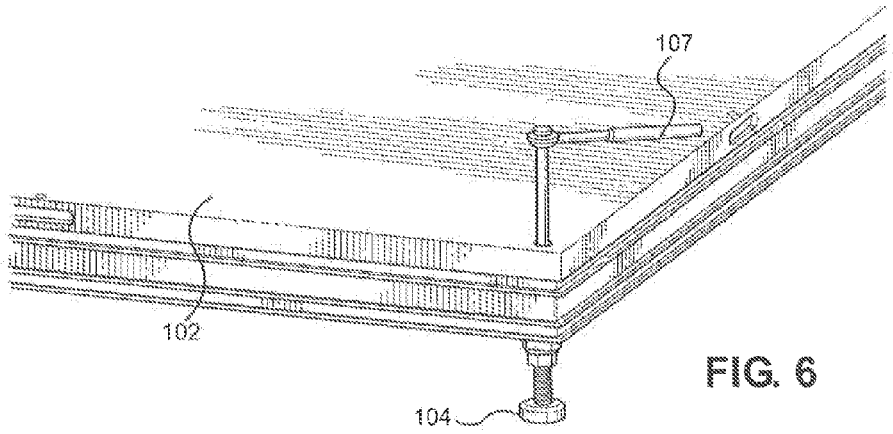

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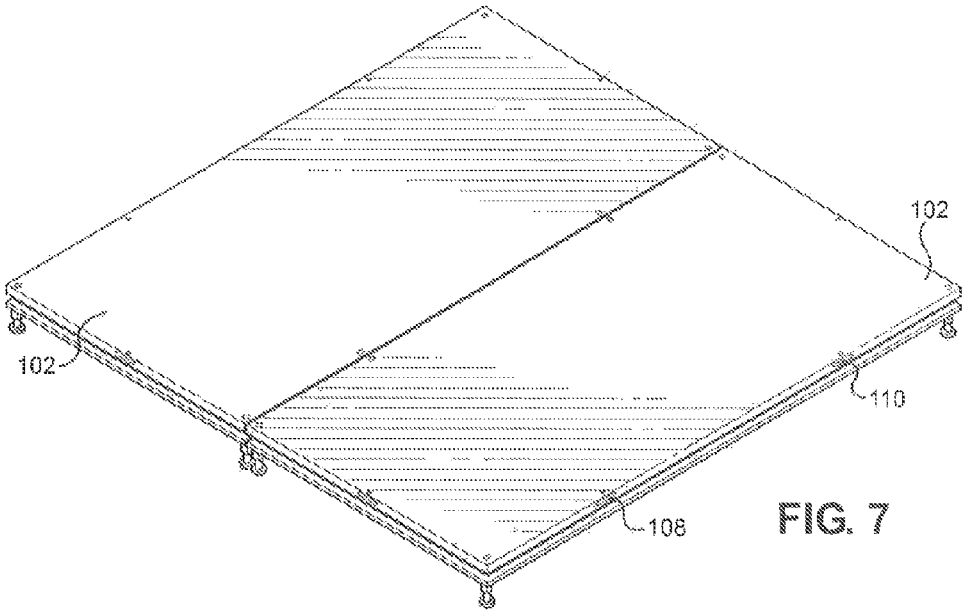

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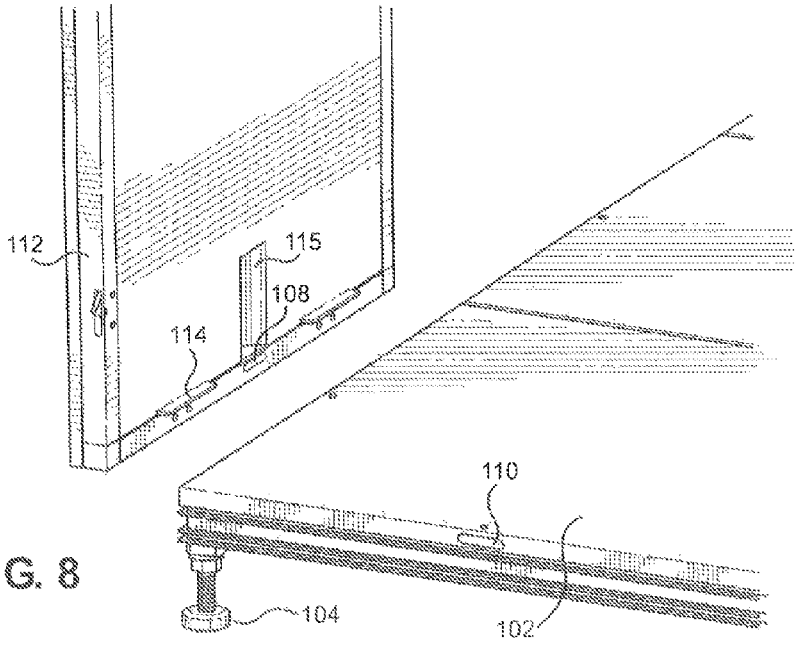

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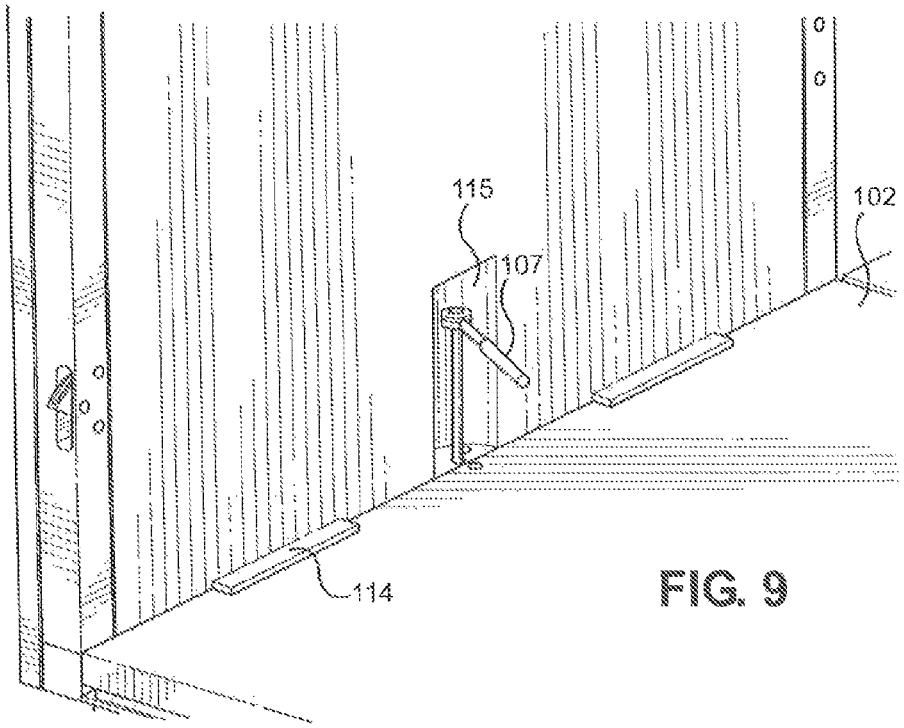

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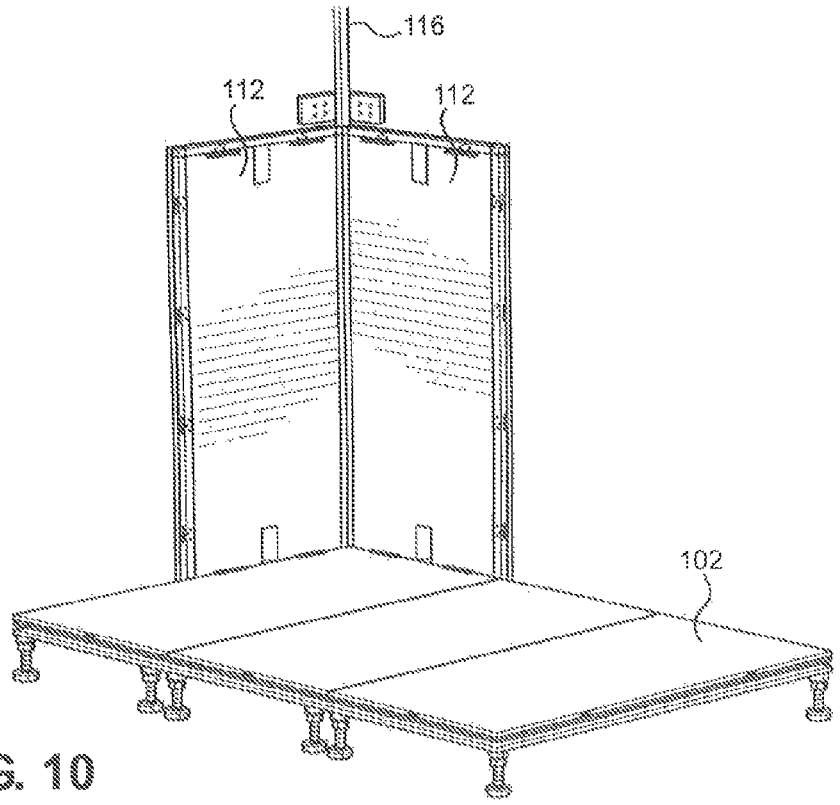

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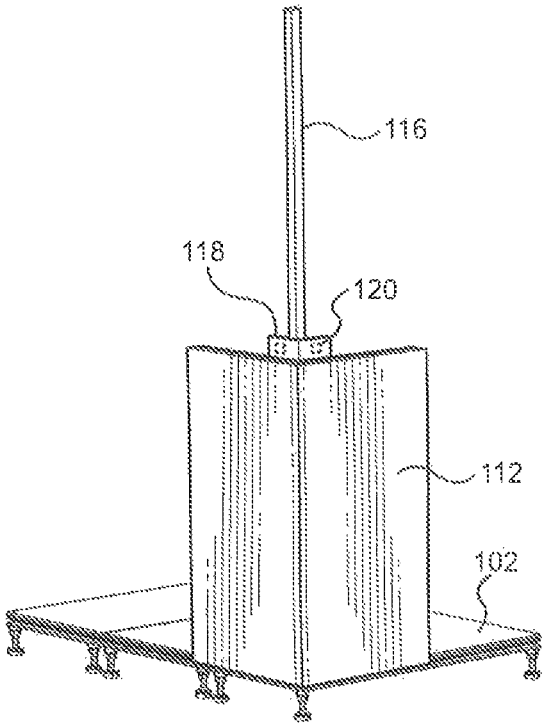

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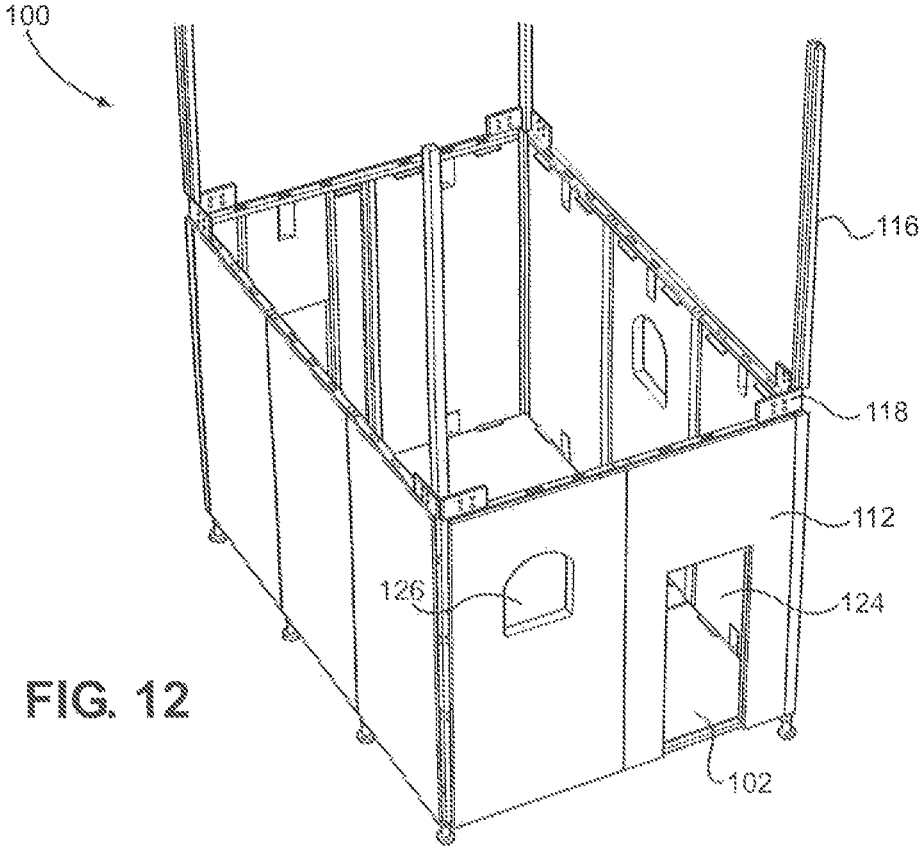

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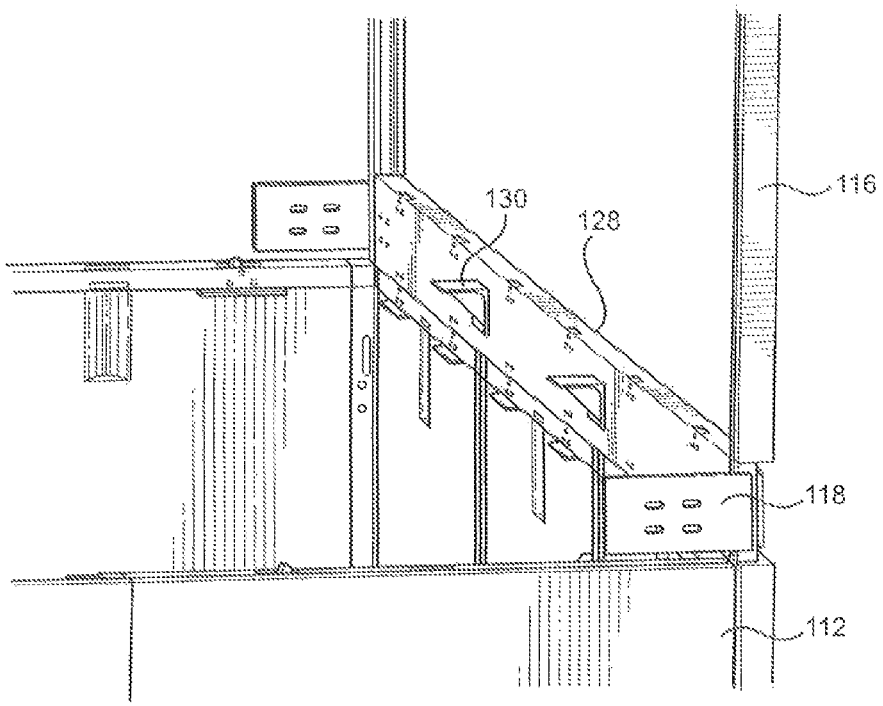

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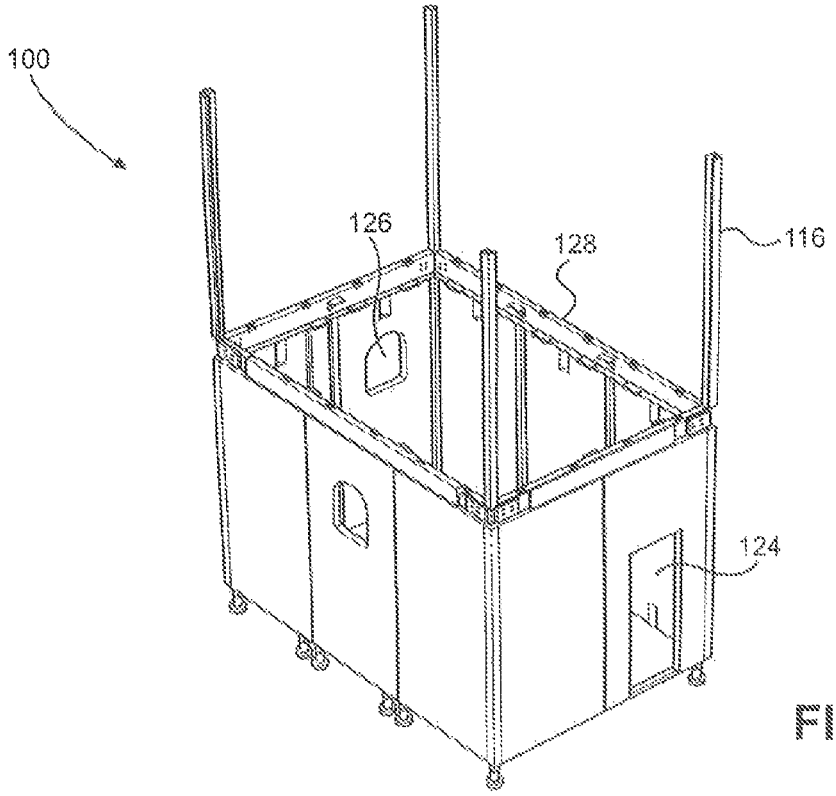
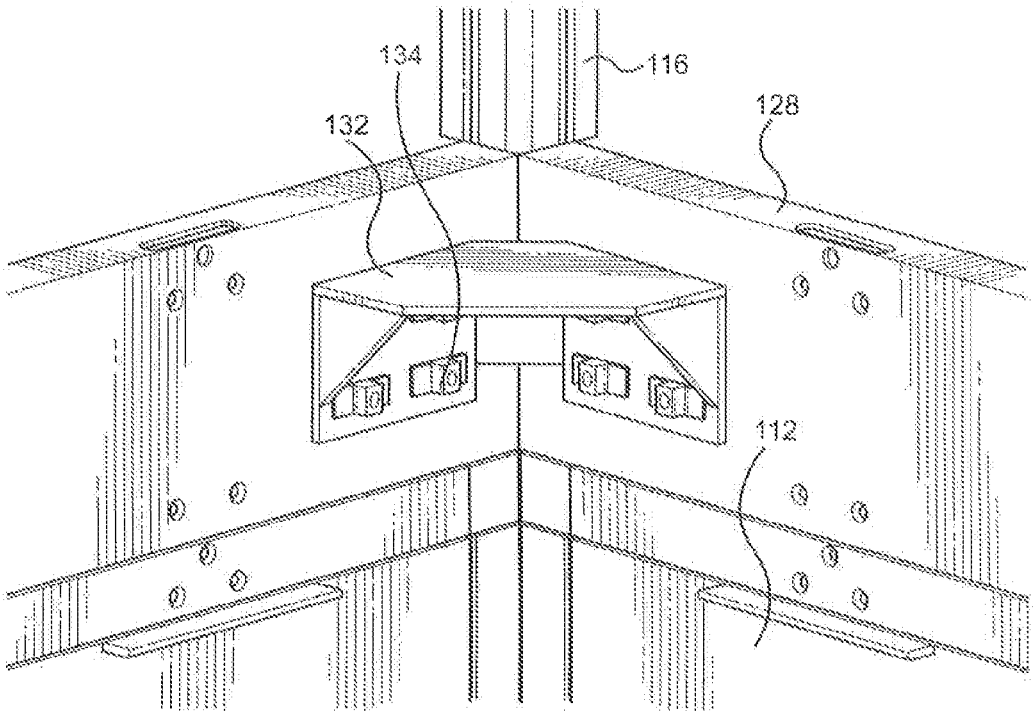


FIG. 14



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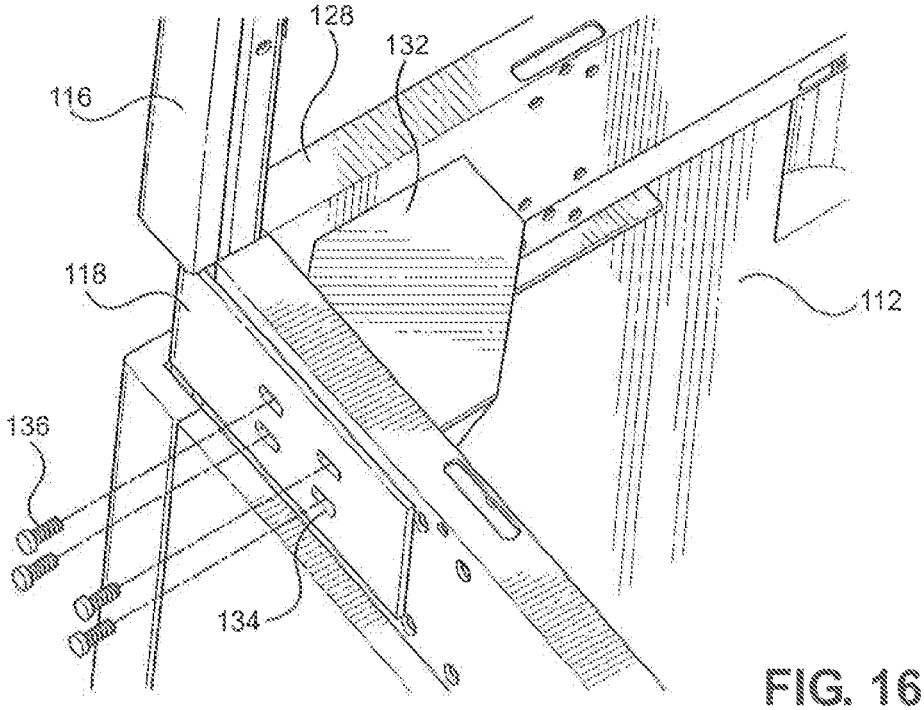
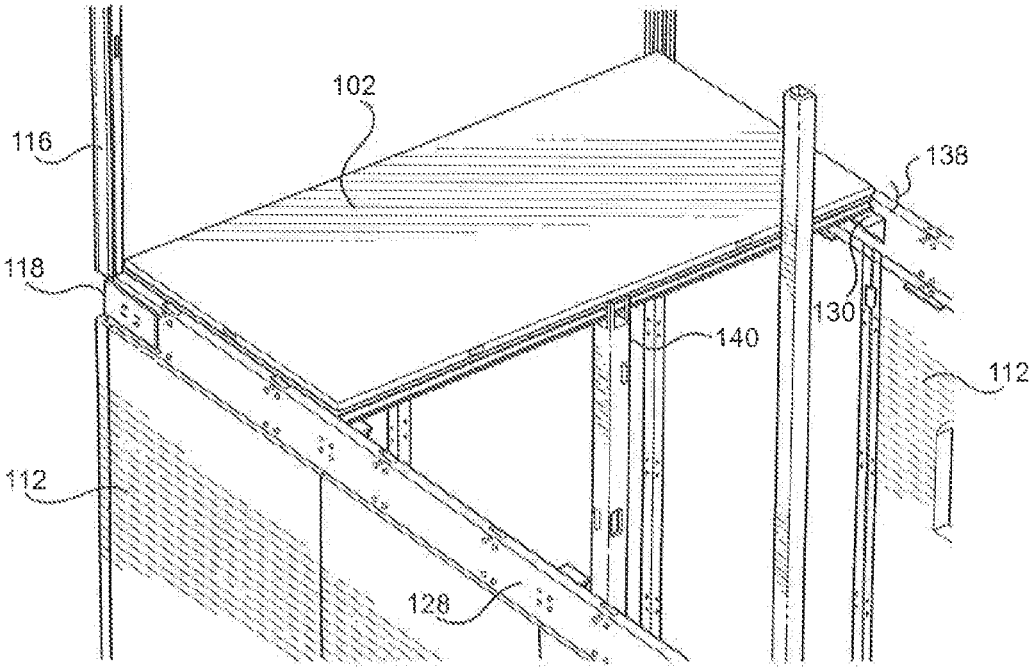


FIG. 16



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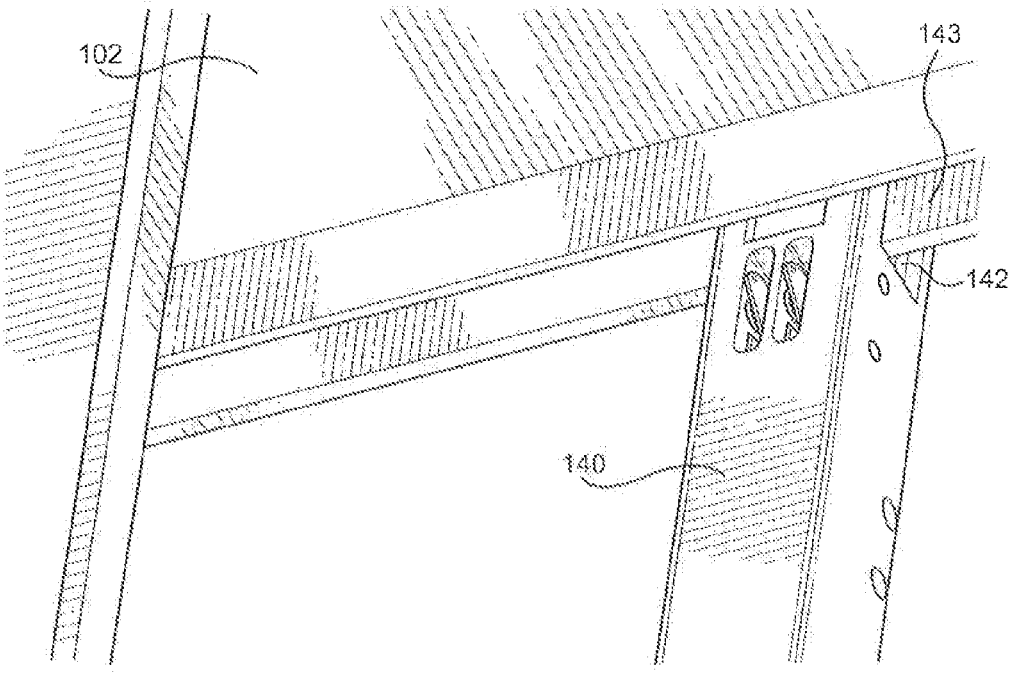


FIG. 18

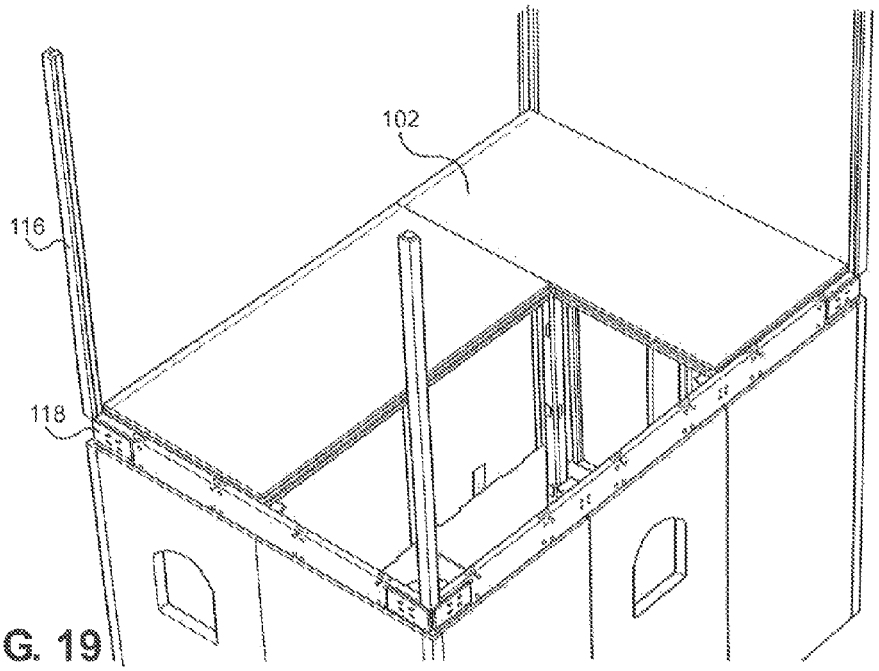
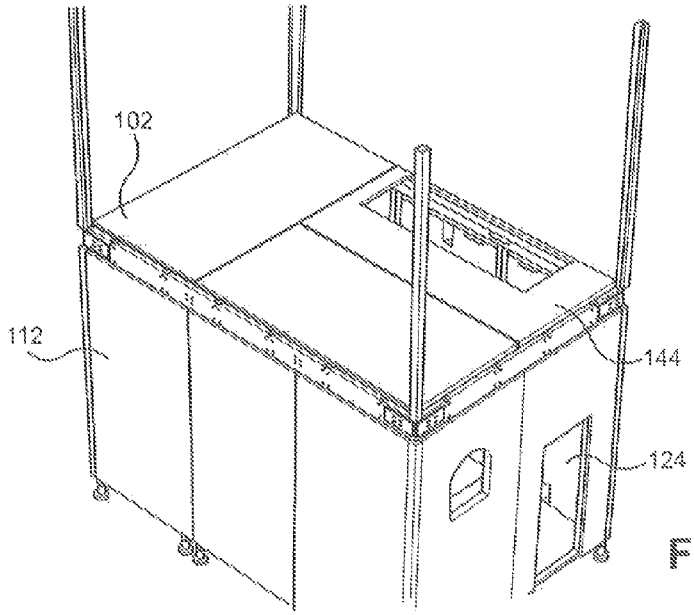


FIG. 19



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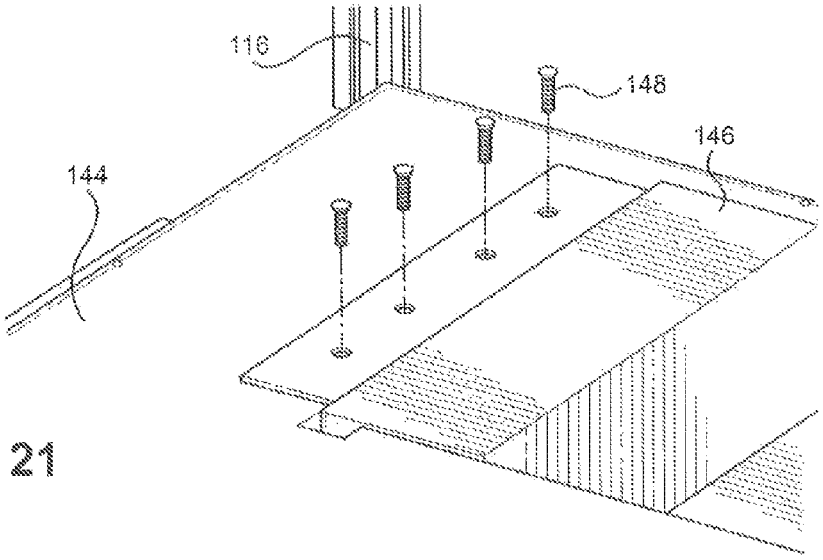


FIG. 21

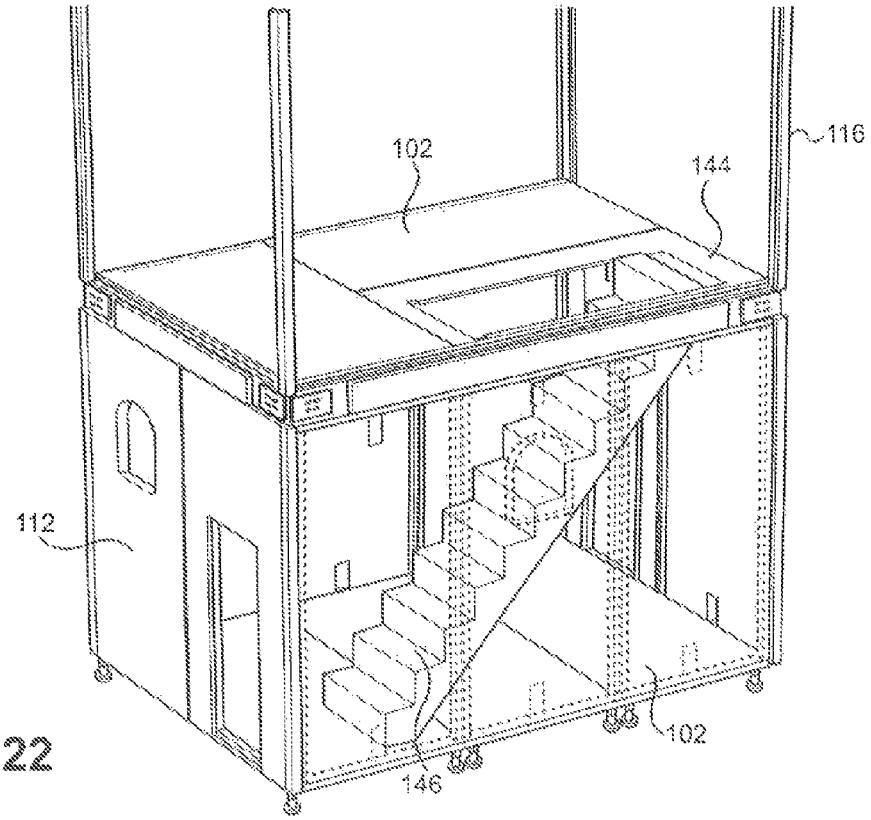
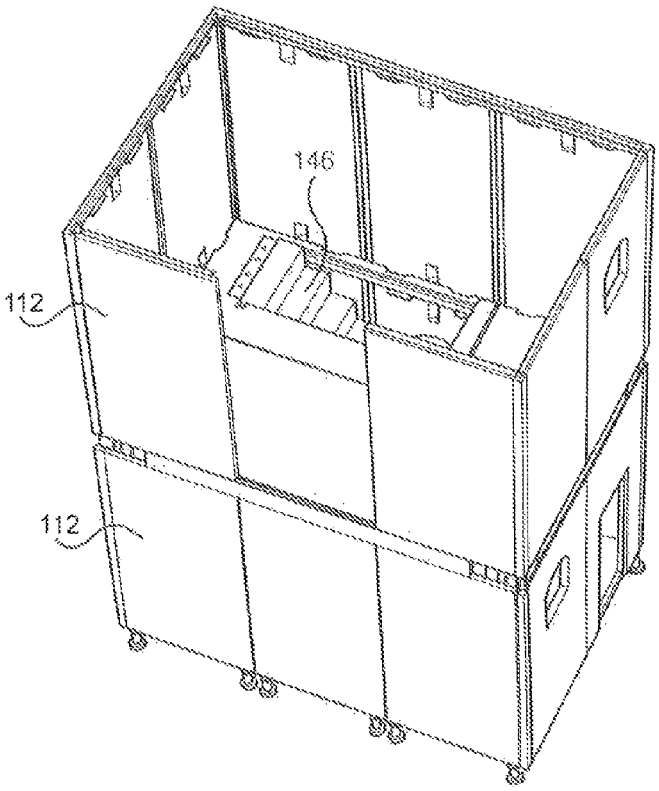


FIG. 22



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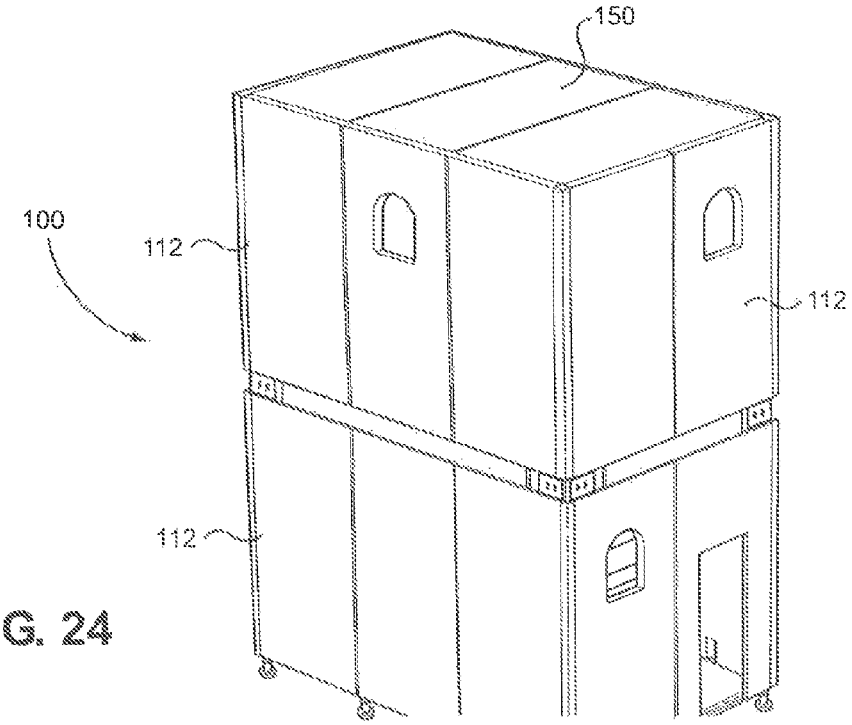

FIG. 24

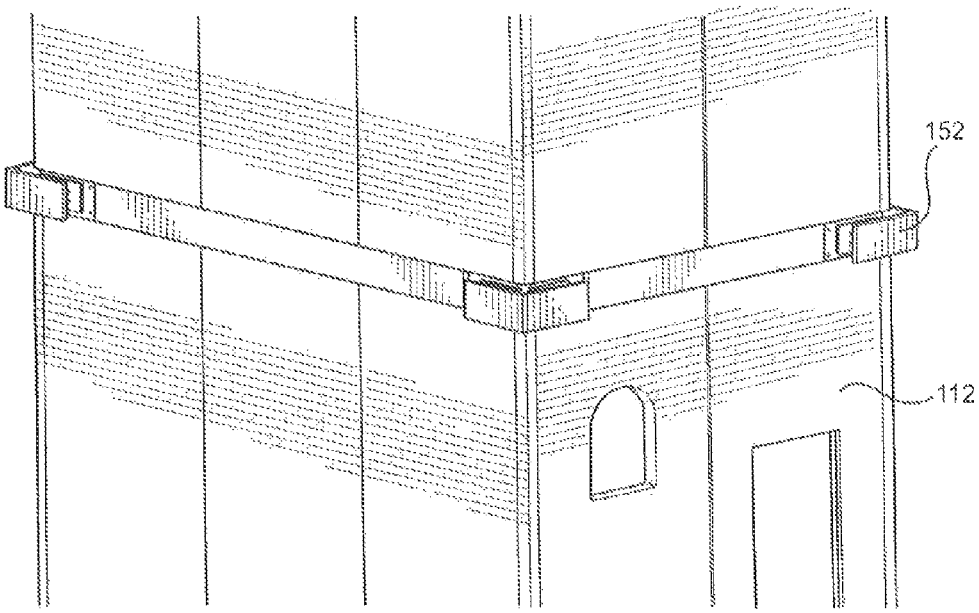

FIG. 25

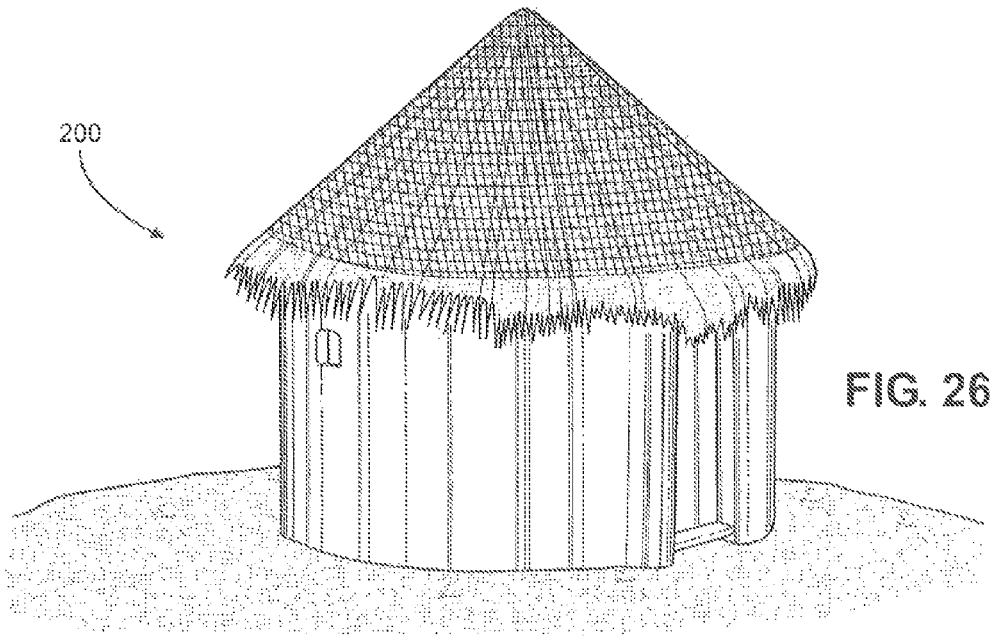

FIG. 26

RELOCATABLE HABITAT UNIT

RELATED APPLICATIONS

This application claims the benefit of priority to U.S. Provisional Patent Application Ser. No. 61/800,838 filed Mar. 15, 2013, entitled "Relocatable Habitat Unit", and currently co-pending.

FIELD OF THE INVENTION

The present invention pertains generally to Relocatable Habitat Units (RHUs) for use in simulating an environment for a military combat training scenario. More particularly, the present invention pertains to an RHU that can be assembled and disassembled on-site, using panels that can be maneuvered, positioned and interconnected by no more than two men. The Present invention is particularly, but not exclusively, useful as a system and method for the complete assembly of an RHU using only a single hand-operated tool.

BACKGROUND OF THE INVENTION

Military training must necessarily be conducted in an environment that will simulate anticipated combat operations as accurately as possible. For a comprehensive training program, this requires the ability and flexibility to relocate and set-up several different types of training environments. In general, training sites may need to selectively simulate either an urban, suburban, or an open terrain environment.

For a training site, the realism that can be attained when simulating a particular environment can be clearly enhanced by introducing indigenous persons (i.e. actors) into the training scenario. In addition to the indigenous persons, urban and suburban environments can be even more realistic when trainees are confronted by obstacles, such as buildings (e.g. habitats). In most instances, such structures can be relatively modest. Nevertheless, their integration into the training scenario requires planning.

Providing realistic buildings for a training environment requires the collective consideration of several factors. For one, the buildings need to present a visual perception accurate for the particular training scenario. Stated differently, they need to "look the part." For another, it is desirable that structures assembled on the training site be capable of relatively easy disassembly for relocation to another training site and subsequent use. The use of state-of-the-art movie industry special effects, role players, proprietary techniques, training scenarios, facilities, mobile structures, sets, props, and equipment, all contribute to the Hyper-Realistic™ training model and serve to increase the quality of training.

For military mountain locations such as the Marine Corps Mountain Warfare Center, near Bridgeport, Calif., the 8,000 feet elevation is accessible only by four-wheel drive vehicles. Some mountains, such as those in Fort Irwin, Calif., are accessible only by helicopter. Additionally, only non-permanent structures may be placed on the Marine Corps Mountain Warfare Center due to regulations, the nature of the military compound, and the environment. With this last point in mind, the ability to easily transport, assemble, and disassemble a building used as a training aide is a key consideration.

Heretofore, military combat training scenarios have been conducted either on open terrain, or at locations where there were pre-existing buildings or structures. The alternative has been to bring prefabricated components of buildings to a training site and then assemble the components to create the building. Typically, this has required special equipment, considerable man-hours of labor, and sometimes even requiring the assistance of Military Construction Units (MILCON); requiring significant military financial resources to erect and disassemble such "non-permanent" structures.

In light of the above, it would be advantageous to provide a training environment which can utilize the Hyper-Realistic™ combat environment at any on-site location in a variety of complex, tactically challenging configurations. It would be further advantageous to provide a training environment where the structures are field-repairable. This allows realistic visual feedback to trainees during live fire field exercise, while still allowing multiple training runs without the need to replace training structures.

It is an object of the present invention to provide a repairable construction set and method for assembling and disassembling an RHU in a variety of configurations, at a training site, with as few as two persons. Alternatively, it is an object of the present invention to provide a repairable non-permanent construction set, having the ability of off-site assembly for air transport to facilitate training in remote locations or at high altitudes for specialized military training without the need for MILCON. Still another object of the present invention is to provide a construction set that requires the use of only a single, hand operated tool for the assembly and disassembly of an entire RHU. Yet another object of the present invention is to provide a construction set for the assembly and disassembly of an entire RHU that is relatively simple to manufacture, extremely simple to use, and comparatively cost effective.

SUMMARY OF THE INVENTION

The Relocatable Habitat Unit (RHU) of the present invention is assembled using a plurality of substantially flat panels, designed to be modular, scalable, reconfigurable, and relocatable.

The RHU is based on a lightweight 4'×8' composite material panel system and engineered to assemble into multi-story, complex configurations with a single tool. The RHU panels are constructed with pultruded fiberglass reinforced plastic beams, bonded with wood, composite, or expanded polystyrene foam panels that are laser cut to replicate the look and texture of various building materials like brick, adobe, mud, wood, bamboo, straw, thatch, etc., sprayed with one-eighth inch of a fire retardant pro-bond and "sceniced" (Pronounced SEE-nicked; a movie industry term that means "aged" to look weathered). Materials and construction provide all-weather, long-lasting, fire-retardant structures suitable for year-round military training in all environments.

In a preferred embodiment, any interior or exterior panel can be interchanged. Common amenities such as windows, doors, stairs, etc. can be attached or installed to the RHU structure. Additionally, a variation of these modular panels can also be used to clad other structures, such as containers, wooden temporary structures, or permanent buildings. For this assembly operation, each panel includes male (M) and female (F) lock connectors. Specifically, these connectors are located along the periphery of each panel. Importantly, all of the (M) connectors can be engaged with a respective (F) connector using the same tool. Thus, an entire RHU can be assembled and disassembled in this manner. Further, each panel is sufficiently lightweight in order to be moved and positioned by one person. As a practical matter, a second person may be required to use the tool and activate the connectors as a panel is being held in place by the other person.

In detail, a construction set for use with the present invention includes a plurality of panels and only the one tool. Each

panel has a periphery that is defined by a left side edge, a right side edge, a top edge, and a bottom edge. However, selected panels can have different configurations that include a door or a window. Still others may simply be a solid panel. In particular, solid panels are used for the floor and ceiling (roof) of the RHU. Furthermore, a panel can be omitted, leaving a void to facilitate an entry or exit to a higher or lower level when the RHU is utilized in the multi-story configuration. Each panel, regardless of its configuration, will include at least one (M) connector and at least one (F) connector that are located on its periphery.

In addition to the wall, floor, and ceiling panels, an embodiment of the construction set also includes corner connections and ceiling attachments. Specifically, corner connections are used to engage wall panels to each other at the corners of the RHU. The ceiling attachments, on the other hand, allow engagement of roof panels with the top edges of wall panels and can also be used to stack multiple levels of a RHU, creating complex multi-level urban structure designs. In the multi-level configuration, vertical corner posts and horizontal beams provide a similar function to the corner connections and ceiling attachments, and are used to construct a frame to support a plurality of panels.

The placement and location of male (M) and female (F) lock connectors on various panels of the construction set is important. Specifically, along the right side edge of each wall panel, between its top edge and bottom edge, the lock configuration is (FMMF). Along its left side edge, the lock configuration is (MFFM). Further, along the top edge the lock configuration is (MM), and along the bottom edge it is (M) or (F), depending on the connector of the floor panel.

Unlike the panels, the corner connections are elongated members with two surfaces that are oriented at a right angle to each other. The lock configurations for a corner connection are (F--F) along one surface and (-FF-) along the other surface. Like the corner connections, the ceiling attachments also present two surfaces that are at a right angle to each other. However, their purpose is different and, accordingly, they have a (FF) lock configuration on one surface for engagement with the top edge of a wall panel. They also have either a (MM) or a (FF) configuration along the other surface for connection with a ceiling panel.

Importantly, in addition to the above mentioned panels, connections, and attachments, the construction set of the present invention includes a single hand tool. Specifically, this hand tool is used for activating the various male (M) connectors for engagement with a female (F) connector, in addition to driving other required hardware. For the present invention, this tool preferably includes a hex head socket, a drive that holds the hex head socket, and a ratchet handle that is swivel-attached to the drive.

For assembly of the RHU, the first task is to establish a substantially flat floor. This is done by engaging male (M) connectors on a plurality of floor panels with female (F) connectors on other floor panels. The floor is then leveled using extensions that can be attached to the floor panels at each corner. Next, a wall is erected around the floor of the RHU by engaging a male (M) connector on the right side edge of a respective wall panel with a female (F) connector on the left side edge of an adjacent wall panel. Recall, the lock configurations on the left and right edges of wall panels are, respectively, (FMMF) and (MFFM). Additionally, the bottom edge of each panel in the wall is engaged to the floor using mutually compatible male (M) and female (F) connectors. Finally, the ceiling assembly of the RHU is created by engaging male (M) connectors on ceiling panels with female (F) connectors on other ceiling panels. The ceiling attachments are then engaged to the assembled ceiling. In turn, the ceiling attachments are engaged to the top edge of a wall panel using mutually compatible male (M) and female (F) connectors. All connections for the assembly of the RHU are thus accomplished using the same tool.

In a preferred embodiment all panels are interchangeable. A frame is constructed consisting of vertical corner posts and horizontal beams (analogous to the corner connections and ceiling attachments), each formed with M and F lock connectors along their length that complement the lock connectors on the panels. Once the frame is in place, the panels may be configured and reconfigured as needed. Vertical corner posts and horizontal beams are also secured together using the single tool and additional hardware. By assembling a plurality of RHUs in this manner, the RHUs can be configured in any complex configuration that will best simulate the indigenous environment desired. A plurality of RHUs can be placed side-to-side, back-to-back, offset, stacked, or staggered to create a multi-level scalable structure. A simple repair kit provides quick easy patching of the composite materials.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features of this invention, as well as the invention itself, both as to its structure and its operation, will be best understood from the accompanying drawings, taken in conjunction with the accompanying description, in which similar reference characters refer to similar parts, and in which:

FIG. **1** is a front view of a preferred embodiment of a multi-story relocatable habitat unit, "sceniced" to resemble a fortress, showing the use of compound walls, and other features; and

FIG. **2** is an alternative embodiment of a single story construction of the present invention showing another manner in which the relocatable habitat unit can be "sceniced" with additional props to resemble real world tactical environments.

FIG. **3** is a perspective view of an adjustable foot module as it is mounted to the underside of a floor panel;

FIG. **4** is a bottom perspective view of the underside of the corner of a floor panel, showing the set screw that secured the adjustable foot module in place;

FIG. **5** is a perspective view of the bottom of a single floor panel, showing the frame, floor board, four adjustable foot modules, and the lock connectors on the visible sides;

FIG. **6** is a perspective view of the top of a corner of a floor panel, showing a lock connector and the tool used to adjust the height of the adjustable foot module;

FIG. **7** is a perspective view of two floor boards after being leveled using the adjustable foot modules and connected together with each floor panel's respective lock connectors;

FIG. **8** is a perspective is a perspective view of a wall panel as it is attached to the edge of a floor panel, showing the access port for actuating the lock connector on the bottom edge of the wall panel, and the ledges that maintain the wall panel's position on the floor panel allowing the user to connect the wall panel to the floor panel with the lock connectors;

FIG. **9** is a perspective view of a wall panel as attached to a floor panel using the lock connectors, showing the ledges on the bottom edge of the wall panel holding the wall panel in place, and the tool as it would be inserted to actuate the lock connectors;

FIG. **10** is a perspective view of three floor panels connected forming a floor of a relocatable habitat unit, with two wall panels connected to the floor panels and to a corner post;

FIG. **11** is a perspective view of the outside of corner of FIG. **8**, showing the interaction of the corner post as it connects to the two wall panels forming a corner of the relocatable habitat unit;

FIG. **12** is a perspective is a top perspective view of the bottom floor of a relocatable habitat unit prior to installation of the second story, showing eight wall panels installed forming the walls of the relocatable habitat unit, with two doors, and two windows;

FIG. **13** is a view of two corner posts as they interact with a ceiling beam, showing the flanges formed to the corner posts that connect to the ceiling beams, and the ledges formed into the ceiling beam for support of the second story floor;

FIG. **14** is a top perspective view of a complete first story of a relocatable habitat unit prior to the installation of the second story floor, showing four ceiling beams installed between the four corner posts for support of the second floor;

FIG. **15** is a perspective view of the interior of the corner post where the flanges and ceiling beams meet, showing a corner bracket installed, with the hardware inserted through the flanges, through the ceiling beams, and into the cage nuts formed onto the interior of the corner bracket;

FIG. **16** is a perspective view of the top of a corner bracket as installed in a relocatable habitat unit, showing the interaction of two ceiling beams, corner post, and the top of the corner bracket that also serves to support the second story floor;

FIG. **17** is a top view of the installation of the second story floor, showing the lock connectors and the interaction of the edges of the floor panel as is lies atop the ceiling beam flanges and the corner brackets, in addition to a four by four support post installed to support the second story;

FIG. **18** is a perspective view of the underside of a second story floor panel where the four-by-four support post is installed;

FIG. **19** is perspective view of the top of a partially constructed relocatable habitat unit showing the installation of a second floor panel for the second story, offset orientation of the second story floor panels, and the location and interaction of the four-by-four support post;

FIG. **20** is a perspective view of the top of the partially constructed relocatable habitat unit showing the installation of the third second story floor panel having a void adapted to accept a staircase;

FIG. **21** is a perspective view of the installation of the hardware for securing the top of the staircase following installation in the relocatable habitat unit;

FIG. **22** is a perspective side view of a completed first story of a relocatable habitat unit showing a look-through view of the interior of the first floor with a staircase installed for access to the second floor;

FIG. **23** is a perspective view of the top of the nearly completed second story of the relocatable habitat unit showing the top access of the staircase and nine of the ten required panels for the top floor;

FIG. **24** is a perspective view of a completed two story relocatable habitat unit showing the roof panels installed on top of the second story;

FIG. **25** is a side view of the installation of the corner post covers that magnetically adhere to the corner post flanges and complete the exterior finish; and

FIG. **26** is a perspective view of the side of a preferred embodiment of the present in invention showing the one of the many ways in which the relocatable habitat unit can be "sceniced" to resemble a real world building, yet still use the basic units of construction discussed herein.

DETAILED DESCRIPTION

Referring initially to FIG. **1**, a preferred embodiment of a multi-story relocatable habitat unit ("RHU") of the present invention is shown and generally designated **100**. As will be explained more fully below, the entirety of the RHU is constructed using five basic parts and a single tool and can be sceniced to resemble a real world tactical environment. Stage production techniques are utilized to provide a real world environment, increasing the quality of tactical training while remaining flexible with the execution and assembly.

Referring to FIG. **2**, a preferred embodiment of a single level RHU of the present invention is shown a generally designated **101**. RHU **101** is shown "sceniced" as a hut that might be found in a desert or grassland environment used to simulate real world tactical training. In this Figure a door **124** is shown formed into a wall panel **112**, as will be discussed more fully below. As can be seen in this Figure, wall panels **112** (explain more fully below) can be built to resemble buildings other than square structures. The illusion of the RHU **101** having a wider base than top is provided by adding more material to the bottom portion of the panels **112** than at the top.

Referring now to FIG. **3**, the construction of the RHU **100** begins with one or more floor panels **102**, a portion of which is shown in this Figure with a single adjustable foot module **104** attached. Adjustable foot module **104** is utilized to level the floor panel in relatively flat terrain (preferably less than four percent grade). A single tool (not shown), typically a hex tool and a common ratchet can be employed to secure or adjust every attachment in the RHU **100**.

Floor panels are interchangeable with other floor panels and generally sturdy, being formed of a metal frame such as aluminum, steel, other suitable material, with a wooden or composite floor. Each floor panel **102** is designed to withstand tactical training, on the first level or the second level of RHU **100**.

Referring now to FIG. **4**, the underside of the floor panel **102** is shown where adjustable foot module **104** is inserted into a receiver formed in the floor panel **102** and secured by a set screw **106**. The adjustable foot module **104** can be used on any corner of any floor panel **102** in use.

Referring to FIG. **5**, the underside of a floor panel **102** is shown with four adjustable foot modules **104** inserted into a receiver and secured allowing the user to level the floor panel on the terrain. Each of the floor panels is individually leveled with the adjacent floor panels **102** to maintain a flat platform on which to construct the remainder of the RHU **100**.

Referring to FIG. **6**, the tool **107** is inserted and engages with the adjustable foot module **104** to adjust the height and level of the floor panel **102**. Tool **107** is a notionally a common ratchet set with a hex tool, similar to an Allen wrench and will be used throughout construction of the RHU **100**.

Referring to FIG. **7**, multiple floor panels **102** can then be leveled and attached along their adjacent edges through the use of male (M) lock connectors **108** and female (F) lock connectors **110**. Two floor panels **102** have been connected together, forming a larger floor that will form part of the base of RHU **100**. In a preferred embodiment of RHU **100**, any practical number of floor panels **102** can be connected to create a larger floor plan. Tool **107** is used to connect and disconnect lock connectors **108** and **110**, and secure corner posts and ceiling beams to the RHU **100**.

Referring to FIG. **8**, a wall panel **112** is shown as it would be attached to the edge of a floor panel **102**. The wall panel has ledges **114** that aid in supporting the weight of the wall panels **112**, as the user is securing the M lock **108** on the base of the wall panel **112** to an F lock **110** (not visible from this angle) on the edge of the floor panel **102**. Each of the wall panels **112** has at least one M lock **108** or at least one F lock **110** along the interior face of the bottom edge, where the wall panel **112** comes in contact with floor panel **102**. An access port **115** provides the user with access to fit the tool **107** and actuate the M lock **108**, as depicted by FIG. **9**.

FIG. **9** shows a common ratchet as tool **107** actuating the M lock **108**. Shown are ledges **114** formed into the frame of wall panel **112** that help support the weight of the wall panel **112** during construction. The ledges **114** are not intended to be critical load bearing members once the frame (shown in FIG. **10**) of the RHU **100** is complete.

Referring to FIG. **10**, two wall panels **112** are shown connected to the floor panels **102** through the use of the M locks **108** and F locks **110** (shown in FIG. **9**). As the wall panels **112** are secured in place, a corner post **116** is connected to the first wall panel **112** through the use of the M locks **108** and F locks **110**. The corner post **116** is an elongated, metal member with a roughly square cross section. At least two of the adjacent sides that meet wall panels **112** at a given corner have M locks **108** and F locks **110** disposed about the length of the corner post **116**. In an embodiment, a corner post **116** may be formed with appropriate lock connectors **108** and **110** as needed on more than two adjacent surfaces along the corner post's **112** length to accommodate additional designs. Such an embodiment might require a T-shaped intersection where three walls come together, or even four walls, as required.

Referring to FIG. **11**, an opposing view from that of FIG. **10** is shown. Corner post **116** is connected along its length to two wall panels **112** with the use of the M locks **108** and F locks **110** disposed one the edges. This Figure also shows the two flanges **118** orthogonally disposed on adjacent sides of corner post **116** at approximately the height of the wall panels **112**. Flanges **118** are formed with holes **120** to accept hardware **122** that will ultimately secure ceiling beams (discussed below).

Referring to FIG. **12**, ten wall panels **112** are erected around the edges of the three floor panels **102** that form the floor of RHU **100**. Four corner posts **116** are utilized to support the four corners of the first floor of the RHU **100**. As shown, the wall panels **112** can be formed with one of several amenities common in a typical building. Amenities such as a door **124** or a window **126** can be formed into the wall panels **112** as needed. Additionally, the wall panels are interchangeable, being identically built and reconfigurable once the RHU **100** is complete.

In a preferred embodiment, wall panels **112** are formed of a frame composed of pultruded fiberglass reinforced plastic beams, bonded with wood, composite, or expanded polystyrene foam panels that are laser cut and sceniced to replicate the look and texture of various building materials like brick, adobe, mud, wood, bamboo, straw, thatch, among other materials.

Because tactical military training often requires live ordnance, panels may become damaged. The ability to repair or quickly reconfigure a wall panel **112** from a solid wall to a door **124** or window **126** panel is of great utility saving considerable time and money.

Referring now to FIG. **13**, to construct the ceiling attachment assembly, a ceiling beam **128** is secured between flanges **118** in order to both provide structural support to the wall panels **112**, but also to support the second floor of RHU **100**. Tabs **130** are also formed to the interior of beam **128** supplying additional support to the floor panels **102** (shown in FIGS. **3-12**) that will be employed as the ceiling, or floor of the second story.

Referring now to FIG. **14**, a top perspective view of the first story of the RHU **100** after the remaining ceiling beams **128** are installed creating the ceiling attachment assembly to which the ceiling or next story will be secured is shown.

Referring to FIG. **15** an interior view of a corner bracket **132** is shown installed in the corner where two ceiling beams **128** meet. The corner bracket **132** is formed with at least two orthogonal faces that meet flanges **118** (shown in FIGS. **11-13**), and holes **134** sized to receive hardware **136** (shown in FIG. **16**). Hardware is notionally a bolt, capable of being driven by tool **107**, maintaining the simplicity of construction. Additionally, holes **134** in corner bracket **132** can either be internally threaded or alternatively be equipped with cage nuts connected or otherwise formed to the interior of the corner bracket **132**. In an embodiment, just as tabs **130** assist in supporting the floor panels **112** of the second story (or ceiling of the first story), the tops of corner bracket **132** are formed to assist in the support of the same.

Referring to FIG. **16**, a perspective view of the top of a corner bracket **132** is shown as installed between two ceiling beams **128**. Hardware **136** is more clearly shown here as it is inserted to secure the components together.

Referring now to FIG. **17**, the beginning of installation of the second story floor of the RHU **100** is shown, with the addition of a first floor panel **102**. Floor panels on a second story of an RHU **100** do not physically attach to the ceiling beams **128**, but rather rest on the tabs **130** and the corner brackets **132** (shown in FIGS. **15-16**). The top surface of the tabs **130** and the corner brackets **132** lies below the top of ceiling beams **128** creating a ridge **138** that helps maintain the position of floor panels **102** in use as a second story floor of RHU **100**. In order to maintain integrity of the floor panels **102**, each of the panels **102** in use is connected to the adjacent floor panel **102** with the use of lock connectors **108** and **110**.

This Figure also shows the addition of support post **140** as it is installed to provide additional support to the floor panels **102** as they are installed on the second floor and will support the intersection of the three floor panels **102** in use in this embodiment of RHU **100**.

Support post **140** is provided to create a more secure upper floor. As the surface area of a second story of a multi-level RHU **100** increases, the amount of support to maintain a level second floor also increases. Support post **140** is notionally a four-by-four beam made from any of a number of materials from a composite to metal or wooden members. While weight is a concern, the more important aspect is safety and security of RHU **100**.

FIG. **18** is a perspective view of the interaction of the support post **140** with the bottom of the floor panel **102**. The support post **140** has a registration pin (not shown) in the bottom, that fits into the registration hole (not shown) in the floor panel **102**. The registration hole indicates a strong point in the floor, generally positioned over an intersection of floor panels **102** where the increased support of the adjustable foot module **104** (shown in FIGS. **3-7**) is located. Thus, support post **140** transfers the load from the intersection of second story floor panels **102**, to the ground through the foot module **104**, decreasing the sheer stresses applied to the floor panels **102** that comprise the second floor of RHU **100**.

Notches **142** formed in the top of the support post **140** are sized to accept the rails **143** formed in the bottom of the second story floor panel. The remaining floor panels **102** are intended to be oriented 90° from the first panel, as shown in

FIGS. **19** and **20**. This scheme of manipulating the orientation of the second story floor panels **102** more evenly distributes the loads applied to the second story and ensures a more structurally sound RHU **100**. In an embodiment, it is desirable to support each second story floor panel **102** about all four corners.

Referring to FIG. **19** a second floor panel **102** is installed on the second story floor of RHU **100**, supported on each corner and connected to the adjacent floor panel **102** with lock connectors **108** and **110**.

In FIG. **20**, the third and final second floor panel **102** installed on the second story floor of RHU **100** is shown, this time modified as a stairwell panel **144**, providing a means for installation of a staircase **146** (shown in FIG. **22**) and access to the second story of the RHU **100**.

FIG. **21** shows the close up of the installation of a staircase **146**, and hardware **148** as would be used to secure the staircase **146** to the stairwell panel **144**.

Referring to FIG. **22**, a side perspective of an almost complete RHU **100** is shown with a look-through to the staircase **146** and the completed first floor.

Referring to FIG. **23**, construction of the walls, using additional wall panels **112** continues as the second story is shown nearly enclosed with nine out of ten wall panels **112** installed. As before, the corner posts secure to adjacent wall panels **112** using lock connectors **108** and **110**, in the same manner in which the lock connectors **108** and **110** are used to secure adjacent wall panels **112** together.

Referring to FIG. **24**, flat roof panels **150** are installed in the same manner in which the floor panels **102** were installed to create the floor of the second story. All flat roof panels **150** are identical and are substantially similar to floor panels **102**. Like floor panels **102**, flat roof panels **150** have male lock connectors **108** on two sides and female lock connectors **110** on two sides. With the wall panels **112** locked into the floor, the lock connectors **108** and **110** in the wall panels **112** will be the correct gender to mate with the roof panels **150**. Note the position of the wall locks and rotate the roof panel to mate with them. The tool **107** (shown in FIGS. **6** and **9**) is again used to actuate the individual male lock connectors **108** to lock the panels **112** and **150** into place.

The last step in the process of construction of RHU **100** is the addition of the foam corner pieces **152** as shown in FIG. **25**. Foam corner pieces are formed with a magnetic backing that adheres to the exterior of flanges **118** (shown in FIGS. **11-13**) on corner posts **116** (shown in FIGS. **10-23**). Alternatively, the foam corner pieces **152** may be attached by utilizing snap locks, hook and loop fasteners, or any other similar fastening methods known in the art.

Referring to FIG. **26**, an alternative preferred embodiment of RHU of the present invention is shown and generally designated **200**. RHU **200** is a round construction, resulting from the ability to vary the shape of the roof panels **150** and the floor panels **102**. In an embodiment, the wall panels **112** need not be symmetrical or uniformly thick throughout their construction adding an illusion that the building is not perfectly square as in RHU **101** of FIG. **2**. While the shape and cut of the panels that comprise the round RHU **200** are not exactly the same size or shape as the floor panels **102**, wall panels **112**, and roof panels **150**, the same concepts and mechanisms are at work. Assembly and disassembly of RHU **200** is as fast and easy and uses the same tool **107** as above.

While the particular Relocatable Habitat Unit **100** of the present invention as herein shown and disclosed in detail is fully capable of obtaining the objects and providing the advantages herein before stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention. No limitations are intended to the details of construction or design herein shown other than as described in the appended claims.

What is claimed is:

1. A construction set for a relocatable habitat unit for use in simulating an environment for military combat training, the construction set comprising:

a plurality of floor panels having a periphery defined by a left side edge, a right side edge, a top edge, and a bottom edge, at least one adjustable foot module extending from the bottom of each floor panel, a registration hole, a plurality of rails, and at least one access hole located on the top of the floor panels and positioned collinear with the adjustable foot and configured to receive the head of a tool to engage the adjustable foot for adjustment;

a plurality of wall panels having a periphery defined by a left side edge, a right side edge, a top edge, and a bottom edge, a plurality of ledges located near, and parallel to, the bottom of the wall panels, and "sceniced" on the exterior to mimic build material;

a plurality of roof panels having a periphery defined by a left side edge, a right side edge, a top edge, and a bottom edge;

a plurality of male lock connectors disposed along the left side edge and the right side edge of each wall panel wherein the left side edge and right side edge of each wall panel include and equal number of female connectors, disposed in opposing sequences and located on the periphery thereof such that when the left side edge of a wall panel abuts the right side edge of another panel each male connector abuts a female connector, and wherein the tip edge of each wall panel has a least one male and at least one female connector and the bottom edge has at least one male or female connector;

a plurality of elongated corner posts with an approximately square cross-section formed with male and female connectors on two adjacent surfaces, a plurality of flanges orthogonally disposed on adjacent sides and located at the approximate mid-section of the corner post a plurality of female lock connectors disposed along the length of the corner post, and holes to accept hardware;

a plurality of horizontal ceiling beams secured between corner post flanges having tabs formed to the interior of the ceiling beam configured to support an edge of floor panels, and a plurality of female and male lock connectors;

a plurality of corner brackets having a first vertical plate formed with a plurality of holes orthogonally arranged and fixedly attached to a second vertical plate formed with a plurality of holes, and a horizontal top plate arranged perpendicular and fixedly attached to said first vertical plate and second vertical plate and configured to attach to at least one ceiling beam to support a floor panel;

a single hand tool with a head used for activating a male lock connector for engagement with a female lock connector; and

a support post having a first and second end, a registration pin extending from the first end, a plurality of female lock connectors, and a notch formed on the second end,

wherein a first sub-set of the plurality of floor and wall panels are combined with a plurality of corner posts, ceiling beams, and corner brackets to form a first story of a relocatable habitat unit, and a second sub-set of the plurality of floor and wall panels are combined with roof panels, the ceiling beams, and the corner brackets to form a second story of the relocatable habitat unit.

2. The construction set of claim 1, wherein said wall panel comprises:

a frame;

a panel formed within said frame;

at least one male and one female lock connector located within said frame;

an access port formed into said panel as a means for said single hand tool to actuate said male and female lock connectors.

3. The construction set of claim 2, wherein said frame of said wall panel comprises pultruded fiberglass reinforced plastic beams and said panel comprises a lightweight and sturdy material.

4. The construction set of claim 1, wherein said floor panel comprises:

a frame;

a floor formed within said frame; and

at least one male and one female lock connecter located within said frame.

5. The construction set of claim 4, wherein said frame of said floor panel comprises metal beams and said floor comprises a lightweight and sturdy material.

6. The construction set of claim 1, wherein said floor panel is used as a ceiling panel.

7. The construction set of claim 1, further comprising foam corner pieces removably attached to said flanges of said corner post.

8. The construction set of claim 1, wherein said single hand tool comprises:

a hex head socket;

a drive that holds the hex head socket; and

a ratchet handle that is swivel-attached to said drive.

9. The construction set of claim 1, wherein said wall panel further comprises a door formed in said panel.

10. The construction set of claim 1, wherein said wall panel further comprises a window formed in said panel.

11. The construction set of claim 1, wherein said floor panel further comprises a staircase.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 9,157,249 B2
APPLICATION NO.	: 14/217216
DATED	: October 13, 2015
INVENTOR(S)	: Segall

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the claims

Column 10, line 32, claim 1, change "tip" to -top-

Signed and Sealed this
Twenty-sixth Day of July, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office